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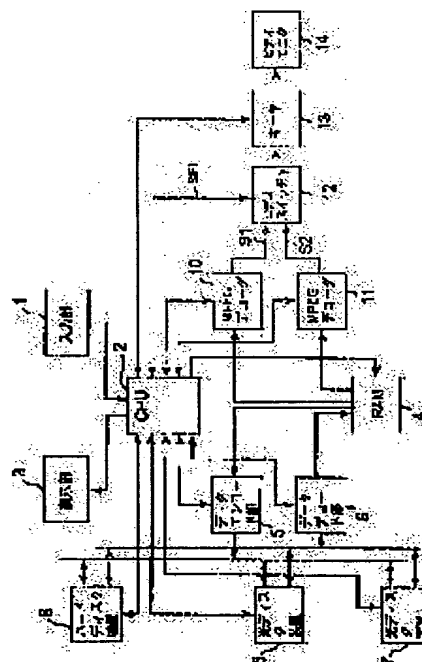
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(54) RECORDING AND REPRODUCING DEVICE AND METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To realize recording and reproducing method and device capable of editing compressed material without inviting image deterioration.

SOLUTION: Compressed material before an editing point and compressed material after the editing point are read from a recording medium and stored in a RAM 4, the compressed material before the editing point and the compressed material after the editing point are respectively read in time division from the RAM 4 at a reproducing speed of ≥ 1 double speed and parallelly decoded by MPEG decoders 10 and 11, and a video switcher 12 switches a baseband video signal before the editing point and a baseband video signal after the editing point obtained in this way at the editing point and makes the time bases meet each other. Therefore, decoding (expansion)/recoding (compression) does not have to be repeated any more between a baseband and the compression material as in the conventional practice whenever editing is performed, and it is consequently possible to edit the compressed material without inviting the image deterioration.



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CLAIMS

[Claim(s)]

[Claim 1] The record regenerative apparatus characterized by providing the following. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least — the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — a temporary storage means to read and store temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit from this temporary storage means — parallel [read / to time sharing / the compression material of the actual making of the tea, and the compression material after an editing point, at the speed of 1X or more and] — like — decoding — edit — a decode means to generate the material of the actual making of the tea, and the material after an editing point the edit which this decode means generated — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — a reproduction means to double the time-axis of each next material and to reproduce

[Claim 2] The record reproduction method characterized by providing the following. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least — the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — the temporary storage process which reads and stores temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit stored temporarily in this temporary storage process — parallel [read / to time sharing / the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more and] — like — decoding — edit — the decode process which generates the material of the actual making of the tea, and the material after an editing point the edit generated in this decode process — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — the renewal process which doubles the time-axis of each next material and is reproduced

[Claim 3] The record regenerative apparatus characterized by providing the following. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least — the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — a decode means to read and decode the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more the edit which this decode means generated — a temporary storage means to store temporarily the material of the actual making of the tea, and the material after an editing point the edit memorized by this temporary storage means — it changes in [editing] that the material of the actual making of the tea and the material after an editing point were specified — as — reading — edit — the actual making of the tea — a reproduction means to double the time-axis of each next material and to reproduce

[Claim 4] The record reproduction method characterized by providing the following. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least — the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — decode process in which the compression material of the actual making of the tea and the compression material after an editing point are read and decoded at the speed of 1X or more the edit generated in this decode process — the temporary storage process which stores temporarily the material of the actual making of the tea, and the material after an editing point the edit stored temporarily in this temporary storage process — it changes in [editing] that the material of the actual making of the tea and the material after an editing point were specified — as — reading — edit — the actual making of the tea — the renewal process which doubles the time-axis of each next material and is reproduced

[Claim 5] The record regenerative apparatus characterized by providing the following. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least — the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — a temporary storage means to read and store temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit from this temporary storage means — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] — like — decoding — edit — a decode means to generate the material of the actual making of the tea, and the material after an editing point

point the edit which this decode means generated — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — with a reproduction means to reproduce the edit material which doubled the time-axis of the material of the actual making of the tea, and the material after an editing point the edit made applicable to edit at least — the actual making of the tea — the record means which carries out medium record of the edit information showing the change mode in an attribute, a next editing point position, and a next editing point, and the alphabetic information superimposed for an edit material individually, respectively

[Claim 6] The record reproduction method characterized by providing the following. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least — the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — the temporary storage process which reads and stores temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit stored temporarily in this temporary storage process — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] — like — decoding — edit — the decode process which generates the material of the actual making of the tea, and the material after an editing point the edit generated in this decode process — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — with the renewal process which reproduces the edit material which doubled the time-axis of the material of the actual making of the tea, and the material after an editing point the edit made applicable to edit at least — the actual making of the tea — the record process which carries out medium record of the edit information showing the change mode in each attribute, the next editing point position, and the next editing point of a compression material, and the alphabetic information superimposed for an edit material individually, respectively

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the record reproduction method and record regenerative apparatus which carry out record reproduction of the video signal by which compression coding was carried out for example, by the MPEG (Moving Picture Experts Group) method.

[0002]

[Description of the Prior Art] Compression coding of the video signal (a compression material is called hereafter) by which compression coding was carried out by the MPEG method etc. is carried out considering the group called GOP (Group Of Pictures) which collected the drawings for two or more frames (picture) as one unit. By the MPEG method, since compression coding is carried out using frame correlation of a GOP unit, restrictions arise in edit. exceptional — so-called closed one of 1 frame 1GOP — if it is GOP, a problem will not be produced even if it performs cut edit which made the break and the editing point of GOP in agreement

[0003] However, if edit which is simply connected with other compression materials is performed when required information is in the contiguity frame of a video signal in 1GOP at decode, the information on a picture is mixed and decode is not correctly carried out by the knot, but a picture will be confused or it will become the cause of noise generating. It edits, once it carries out the decode (extension) of the compression material and returns it to baseband, in order for the reason to connect on other compression materials and a time-axis or to edit putting in special effect, such as wipe and DEZORUBU, etc., and compression coding is again carried out after edit, and it is made to obtain a compression material.

[0004]

[Problem(s) to be Solved by the Invention] By the way, in this edit mode, whenever it edits, as a result of repeating decode (extension) / re-sign (compression) between baseband and a compression material, there is a problem of inviting picture degradation. Then, this invention was made in view of such a situation, and it aims at offering the record reproduction method and record regenerative apparatus into which a compression material can be edited, without inviting picture degradation.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, in invention according to claim 1 the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with a temporary storage means to read and store temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit from this temporary storage means — parallel [read / to time sharing / the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more and] — like — decoding — edit — with a decode means to generate the material of the actual making of the tea, and the material after an editing point the edit which this decode means generated — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — it is characterized by providing a reproduction means to double the time-axis of each next material and to reproduce

[0006] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 2 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with the temporary storage process which reads and stores temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit stored temporarily in this temporary storage process — parallel [read / to time sharing / the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more and] — like — decoding — edit — with the decoded process which generates the material of the actual making of the tea, and the material after an editing point the edit generated in this decoded process — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — it is characterized by providing the renewal process which doubles the time-axis of each next material and is reproduced

[0007] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 3 — with the record medium with which the compression material of the actual

making of the tea and the compression material after an editing point were recorded the edit from this record medium — with a decode means to read and decode the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more the edit which this decode means generated — with a temporary storage means to store temporarily the material of the actual making of the tea, and the material after an editing point the edit memorized by this temporary storage means — it changes in [editing] that the material of the actual making of the tea and the material after an editing point were specified — as — reading — edit — the actual making of the tea — it is characterized by providing a reproduction means to double the time-axis of each next material and to reproduce

[0008] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 4 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with decode process in which the compression material of the actual making of the tea and the compression material after an editing point are read and decoded at the speed of 1X or more the edit generated in this decode process — with the temporary storage process which stores temporarily the material of the actual making of the tea, and the material after an editing point the edit stored temporarily in this temporary storage process — it changes in [editing] that the material of the actual making of the tea and the material after an editing point were specified — as — reading — edit — the actual making of the tea — it is characterized by providing the renewal process which doubles the time-axis of each next material and is reproduced

[0009] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 5 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with a temporary storage means to read and store temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit from this temporary storage means — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] — like — decoding — edit — with a decode means to generate the material of the actual making of the tea, and the material after an editing point the edit which this decode means generated — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — with a reproduction means to reproduce the edit material which doubled the time-axis of the material of the actual making of the tea, and the material after an editing point the edit made applicable to edit at least — the actual making of the tea — it is characterized by providing the record means which carries out medium record of the edit information showing the change mode in an attribute, a next editing point position, and a next editing point, and the alphabetic information superimposed for an edit material individually, respectively

[0010] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 6 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with the temporary storage process which reads and stores temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit stored temporarily in this temporary storage process — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] — like — decoding — edit — with the decode process which generates the material of the actual making of the tea, and the material after an editing point the edit generated in this decode process — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — with the renewal process which reproduces the edit material which doubled the time-axis of the material of the actual making of the tea, and the material after an editing point the edit made applicable to edit at least — the actual making of the tea — it is characterized by providing the record process which carries out medium record of the edit information showing the change mode in each attribute, the next editing point position, and the next editing point of a compression material, and the alphabetic information superimposed for an edit material individually, respectively

[0011] The compression material of the actual making of the tea and the compression material after an editing point are read and stored temporarily. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in this invention — the edit from the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded — Read the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more, and they are decoded. this edit stored temporarily — edit — the edit after generating the material of the actual making of the tea, and the material after an editing point — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — since the time-axis of each next material is doubled and it reproduces, it becomes possible to edit a compression material, without inviting picture degradation

[0012]

[Embodiments of the Invention] Hereafter, on the stage of operation of this invention is explained with reference to a drawing.

(1) A block diagram 1 is a block diagram showing the composition of the record regenerative apparatus by on the stage of operation of this invention. In this drawing, the input section 1 is equipped with alternative operation children, such as a keyboard and a mouse, generates the event which directs execution of material reproduction, record, and

edit according to operation of these alter operation child, and outputs it to CPU2. CPU2 performs the control program loaded to the system memory which is not illustrated according to the input supplied from the input section 1, and controls each part of equipment to perform material reproduction, record, and edit. A display 3 consists of for example, LCD displays etc., and carries out a screen display of an established state, a mode of operation, etc. of each part of equipment according to the display-control signal supplied from CPU2.

[0013] RAM4 is equipped with a data area and a work area. Various register flag data are stored temporarily in the work area of RAM4. On the other hand, the MPEG data supplied from the data decoding section 9 mentioned later are stored temporarily at the data area of RAM4. The data encoding section 5 changes and outputs the MPEG data read from the data area of RAM4 according to directions of CPU2 to the data format illustrated to drawing 2.

[0014] That is, it changes into the file data FD which formed Header HD in the head after adding the "edge left for applying-paste" of 1 or more GOPs before and after the MPEG data read from the data area of RAM4 so that it might illustrate to drawing 2, and formed Footer FT in the back end, respectively. Header HD and Footer FT consist of two or more attribute items showing the contents of a file, such as a file size. In addition, the "edge left for applying-paste" of 1 or more GOPs added before and after MPEG data is dummy data for performing reproduction of 1X or more.

[0015] Optical disk units 6 and 7 record the file data FD (refer to drawing 2) outputted according to the record directions from CPU2 from the data encoding section 5 or a hard disk drive unit 8, respectively on an optical disk, or reproduce the file data FD by which reproduction directions are carried out from CPU2 among the file data FD recorded on an optical disk, and output it to the data decoding section 9 or a hard disk drive unit 8. In addition, the file data FD recorded on an optical disk is preferably arranged in order of reproduction, and carries out medium record. If file data FD is arranged in order of reproduction and medium record is carried out, correspondence will become possible also with the cheap optical disk units 6 and 7 with a low reproduction rate.

[0016] While a hard disk drive unit 8 records the file data FD outputted from the file data FD by which a reproduction output is carried out from optical disk units 6 and 7, or the data encoding section 5 according to the record directions from CPU2, it reproduces the file data FD by which reproduction directions are carried out from CPU2 among the recorded file data FD, and outputs it to optical disk units 6 and 7 or the data decoding section 9. Moreover, the control program is memorized by this hard disk drive unit 8, and the control program is transmitted to the system memory which is not illustrated at the time of an equipment boot rise. Under control of CPU2, the data decoding section 9 extracts MPEG data from the file data FD which optical disk units 6 and 7 or a hard disk drive unit 8 reproduces, and they carry out a store to the data area of RAM4.

[0017] The MPEG decoders 10 and 11 decode in parallel the MPEG data read from the data area of RAM4 to time sharing, and output the video signals S1 and S2 of baseband to the bottom of control of CPU2. The video switcher 12 changes the video signals S1 and S2 outputted, respectively at an editing point from the MPEG decoders 10 and 11 of the preceding paragraph according to the change signal SEL which CPU2 generates according to editing point specification operation in the input section 1. A keyer 13 superimposes the alphabetic information given to the video signal S1 (S2) changed by the video switcher 12 from CPU2. A video monitor 14 carries out a screen display of the edited video signal.

[0018] (2) Perform and give edit operation ***** explanation in the edit equipment by operation, next the above-mentioned composition. Here, explanation of operation is given at an editing point, using as an example cut edit changed from the compression material A recorded on the optical disk unit 6 to the compression material B recorded on the optical disk unit 7. If first specification operation is carried out so that the compression materials A and B may be made applicable to edit in the input section 1, it is directed to an optical disk unit 6 that CPU2 reproduces the file data FD which contains the compression material A (MPEG data A) according to the operation. Thereby, an optical disk unit 6 carries out the reproduction output of the file data FD containing the compression material A (MPEG data A).

[0019] Next, it is directed that CPU2 decodes the file data FD by which a reproduction output is carried out from an optical disk unit 6 to the data decoding section 9. Then, while the data decoding section 9 divides the file data FD into header HD / footer FT (refer to drawing 2), and the MPEG data A and transmits header HD / footer FT to the CPU2 side, it carries out the store of the separated MPEG data A to the data area of RAM4. If it finishes carrying out the store of the MPEG data A to the data area of RAM4, the file data FD which contains like **** the compression material B (MPEG data B) reproduced from an optical disk unit 7 will be made to decode in the data decoding section 9, and the store of the MPEG data B obtained by this will be carried out to the data area of RAM4.

[0020] If the both sides of the MPEG data A and B made applicable to edit are stored in the data area of RAM4 — editing point specification operation in the input section 1 — corresponding — CPU2 — edit — the MPEG data A which are the compression material A of the actual making of the tea are read from the data area of RAM4. Under the present circumstances, it reads from the need of preparing the "edge left for applying paste" mentioned above before and after the editing point, by the reproduction speed 1X or more, and the MPEG decoder 10 is supplied. And before read-out at an editing point finishes, it is begun by the reproduction speed 1X or more to read the MPEG data B which are the compression material B after an editing point from the data area of RAM4, and the MPEG decoder 11 is supplied.

[0021] In this way, if the MPEG data A and B are read from the data area of RAM4 to time sharing and it is inputted into the MPEG decoders 10 and 11 in parallel, respectively, at the MPEG decoder 10, the baseband video signal A which comes to decode the MPEG data A will be outputted, and, on the other hand, the baseband video signal B

which comes to decode the MPEG data B will be outputted by the MPEG decoder 11. A screen display of the baseband video signals A and B outputted from the MPEG decoders 10 and 11, respectively is carried out to a video monitor 14 as an edit material which was changed at the editing point and continued on the time-axis so that it may be inputted into the video switcher 12 and may illustrate to drawing 2.

[0022] In addition, in the video switcher 12 which changes the baseband video signals A and B, it is also possible to give special effect, such as wipe from which it changes to a back picture after DEZORUBU, straight line, and curve the picture before and behind an editing point changes overlapping move by changing a change mode besides the cut edit changed from the baseband video signal A to the baseband video signal B in an instant.

[0023] The file data FD which stored the compression material of the actual making of the tea, and the file data FD which stored the compression material after an editing point are read from a record medium, thus — the gestalt of this operation — edit — The store of the MPEG data respectively extracted from these file data FD is carried out to RAM4. the edit from this RAM4 — by the reproduction speed of each 1X or more, the MPEG data of the actual making of the tea and the MPEG data after an editing point were read to time sharing, and were decoded in parallel by the MPEG decoders 10 and 11 — edit, since the baseband video signal of the actual making of the tea and the baseband video signal after an editing point are changed with an editing point by the video switcher 12 and a time-axis is doubled. Whenever it edits, as a result of it becoming unnecessary to repeat decode (extension) / re-sign (compression) between baseband and a compression material like before, it is possible to edit a compression material, without inviting picture degradation.

[0024] By the way, since it edits so that a time-axis may be doubled in case not the thing that carries out edit processing of the compression material by which medium record was carried out directly with the gestalt of this operation but the compression material by which medium record was carried out is decoded to baseband and it reproduces, the edited image will be carried out as a compression material, and carrying out medium record will not carry out, but medium record will be carried out in the edit information express the content of edit. That is, if medium record of the edit information showing the attribute (header HD / footer FT of each file data FD which stored the compression material before and behind an editing point), editing point position, and baseband change mode (cut edit, DEZORUBU, or wipe) of the file data FD made applicable to edit is carried out, it will become possible to read it and to reproduce an edit material. Moreover, by the keyer 13, the alphabetic information superimposed for an edit material carries out medium record individually rather than is recorded in the state where it put on the edit material, or, in addition to edit information, medium record is carried out, and in case an edit material is reproduced, it becomes the form superimposed for the edit material which reads it and is reproduced.

[0025] In addition, after the MPEG data A and B which are the candidates for edit store in the data area of RAM4 with the gestalt of operation mentioned above. The MPEG data A and B are read to time sharing by the reproduction speed 1X or more before and behind an editing point. the edit after decoding it in parallel by the MPEG decoders 10 and 11, although the baseband video signal of the actual making of the tea and the baseband video signal after an editing point are changed with an editing point by the video switcher 12 and the time-axis was doubled. Change to this, decode in parallel the MPEG data A and B read from the record medium by the reproduction speed 1X or more by the MPEG decoders 10 and 11, and it stores in the data area of RAM4. the edit stored in the data area of this RAM4 — you may make it the composition read and reproduced so that the baseband video signal of the actual making of the tea and the baseband video signal after an editing point may be changed at an editing point. Moreover, although the material by which MPEG compression was carried out was made applicable to edit with the gestalt of operation mentioned above, the summary of this invention is not limited to this, but can be applied by other animation compression methods other than an MPEG method.

[0026]

[Effect of the Invention] The compression material of the actual making of the tea and the compression material after an editing point are read and stored temporarily. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least according to invention given in claims 1 and 2 — the edit from the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded — Read the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more, and it decodes in parallel. this edit stored temporarily — edit — the edit after generating the material of the actual making of the tea, and the material after an editing point — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — since the time-axis of each next material is doubled and it reproduces, a compression material can be edited, without inviting picture degradation. Read the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more, and they are decoded. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least according to invention given in claims 3 and 4 — the edit from the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded — edit — the edit which generated and generated the material of the actual making of the tea, and the material after an editing point, after storing temporarily the material of the actual making of the tea, and the material after an editing point this edit stored temporarily — it changes in [editing] that the material of the actual making of the tea and the material after an editing point were specified — as — reading — edit — the actual making of the tea — since the time-axis of each next material is doubled and it reproduces, a compression material can be edited, without inviting picture degradation the edit to which the edge-left for applying paste of 1 or more GOPs was added forward and backward at least according to

invention according to claim 5, if the compression material of the actual making of the tea and the compression material after an editing point are reproduced from a record medium and stored in a temporary storage means. The material of the actual making of the tea and the material after an editing point are generated, a decoding means — the edit from this temporary storage means — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] —like — decoding — edit — an edit means — edit — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — since the edit material which doubled the time-axis of the material of the actual making of the tea and the material after an editing point is generated and displayed, a compression material can be edited, without inviting picture degradation moreover, the edit to which the record means was made the candidate for edit at least — the actual making of the tea — if the edit information and alphabetic information are read from a record medium and referred to in order to carry out medium record of the edit information showing the change mode in an attribute, a next editing point position, and a next editing point, and the alphabetic information superimposed for an edit material individually, respectively, the same edit as last time can be performed. The compression material of the actual making of the tea and the compression material after an editing point are reproduced and stored temporarily from the record medium. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least according to invention according to claim 6 — The material of the actual making of the tea and the material after an editing point are generated, this edit stored temporarily — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] —like — decoding — edit — the generated edit — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — since the edit material which doubled the time-axis of the material of the actual making of the tea and the material after an editing point is generated and displayed, a compression material can be edited, without inviting picture degradation moreover, the edit made applicable to edit at least — the actual making of the tea — if the edit information and alphabetic information are read from a record medium and referred to in order to carry out medium record of the edit information showing the change mode in each attribute, the next editing point position, and the next editing point of a compression material, and the alphabetic information superimposed for an edit material individually, respectively, the same edit as last time can be performed

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TECHNICAL FIELD

[The technical field to which invention belongs] this invention relates to the record reproduction method and record regenerative apparatus which carry out record reproduction of the video signal by which compression coding was carried out for example, by the MPEG (Moving Picture Experts Group) method.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Compression coding of the video signal (a compression material is called hereafter) by which compression coding was carried out by the MPEG method etc. is carried out considering the group called GOP (Group Of Pictures) which collected the drawings for two or more frames (picture) as one unit. By the MPEG method, since compression coding is carried out using frame correlation of a GOP unit, restrictions arise in edit. exceptional — so-called closed one of 1 frame 1GOP — if it is GOP, a problem will not be produced even if it performs cut edit which made the break and the editing point of GOP in agreement

[0003] However, if edit which is simply connected with other compression materials is performed when required information is in the contiguity frame of a video signal in 1GOP at decode, the information on a picture is mixed and decode is not correctly carried out by the knot, but a picture will be confused or it will become the cause of noise generating. It edits, once it carries out the decode (extension) of the compression material and returns it to baseband, in order for the reason to connect on other compression materials and a time-axis or to edit putting in special effect, such as wipe and DEZORUBU, etc., and compression coding is again carried out after edit, and it is made to obtain a compression material.

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EFFECT OF THE INVENTION

[Effect of the Invention] The compression material of the actual making of the tea and the compression material after an editing point are read and stored temporarily. the edit to which the edge left for applying paste of 1 or more GOPs was added to claims 1 and 2 forward and backward at least by invention of a publication — the edit from the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded — Read the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more, and it decodes in parallel. this edit stored temporarily — edit — the edit after generating the material of the actual making of the tea, and the material after an editing point — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — the time-axis of each next material is doubled and it reproduces Therefore, a compression material can be edited, without inviting picture degradation. Read the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more, and they are decoded. the edit to which the edge left for applying paste of 1 or more GOPs was added to claims 3 and 4 forward and backward at least by invention of a publication — the edit from the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded — edit — the edit which generated and generated the material of the actual making of the tea, and the material after an editing point, after storing temporarily the material of the actual making of the tea, and the material after an editing point this edit stored temporarily — it changes in [editing] that the material of the actual making of the tea and the material after an editing point were specified — as — reading — edit — the actual making of the tea — the time-axis of each next material is doubled and it reproduces Therefore, a compression material can be edited, without inviting picture degradation. the edit to which the edge left for applying paste of 1 or more GOPs was added for the reproduction means forward and backward at least in invention according to claim 5, if the compression material of the actual making of the tea and the compression material after an editing point are reproduced from a record medium and stored in a temporary storage means The material of the actual making of the tea and the material after an editing point are generated. a decode means — the edit from this temporary storage means — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more.] — like — decoding — edit — an edit means — edit — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — the edit material which doubled the time-axis of the material of the actual making of the tea and the material after an editing point is generated and displayed Therefore, a compression material can be edited, without inviting picture degradation. moreover, the edit to which the record means was made the candidate for edit at least — the actual making of the tea — if the edit information and alphabetic information are read from a record medium and referred to in order to carry out medium record of the edit information showing the change mode in an attribute, a next editing point position, and a next editing point, and the alphabetic information superimposed for an edit material individually, respectively, the same edit as last time can be performed the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least according to invention according to claim 6 — the compression material of the actual making of the tea, and the compression material after an editing point — from a record medium — reproducing The material of the actual making of the tea and the material after an editing point are generated. storing temporarily — this edit stored temporarily — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] — like — decoding — edit — the generated edit — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — since the edit material which doubled the time-axis of the material of the actual making of the tea and the material after an editing point is generated and displayed, a compression material can be edited, without inviting picture degradation moreover, the edit made applicable to edit at least — the actual making of the tea — if the edit information and alphabetic information are read from a record medium and referred to in order to carry out medium record of the edit information showing the change mode in each attribute, the next editing point position, and the next editing point of a compression material, and the alphabetic information superimposed for an edit material individually, respectively, the same edit as last time can be performed

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, in this edit mode, whenever it edits, as a result of repeating decode (extension) / re-sign (compression) between baseband and a compression material, there is a problem of inviting picture degradation. Then, this invention was made in view of such a situation, and it aims at offering the record reproduction method and record regenerative apparatus into which a compression material can be edited, without inviting picture degradation.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, in invention according to claim 1 the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with a temporary storage means to read and store temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit from this temporary storage means — parallel [read / to time sharing / the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more and] — like — decoding — edit — with a decode means to generate the material of the actual making of the tea, and the material after an editing point the edit which this decode means generated — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — it is characterized by providing a reproduction means to double the time-axis of each next material and to reproduce

[0006] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 2 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with the temporary storage process which reads and stores temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit stored temporarily in this temporary storage process — parallel [read / to time sharing / the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more and] — like — decoding — edit — with the decode process which generates the material of the actual making of the tea, and the material after an editing point the edit generated in this decode process — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — it is characterized by providing the renewal process which doubles the time-axis of each next material and is reproduced

[0007] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 3 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with a decode means to read and decode the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more the edit which this decode means generated — with a temporary storage means to store temporarily the material of the actual making of the tea, and the material after an editing point the edit memorized by this temporary storage means — it changes in [editing] that the material of the actual making of the tea and the material after an editing point were specified — as — reading — edit — the actual making of the tea — it is characterized by providing a reproduction means to double the time-axis of each next material and to reproduce

[0008] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 4 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with decode process in which the compression material of the actual making of the tea and the compression material after an editing point are read and decoded at the speed of 1X or more the edit generated in this decode process — with the temporary storage process which stores temporarily the material of the actual making of the tea, and the material after an editing point the edit stored temporarily in this temporary storage process — it changes in [editing] that the material of the actual making of the tea and the material after an editing point were specified — as — reading — edit — the actual making of the tea — it is characterized by providing the renewal process which doubles the time-axis of each next material and is reproduced

[0009] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 5 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with a temporary storage means to read and store temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit from this temporary storage means — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] — like — decoding — edit — with a decode means to generate the material of the actual making of the tea, and the material after an editing point the edit which this

decode means generated — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — with a reproduction means to reproduce the edit material which doubled the time-axis of the material of the actual making of the tea, and the material after an editing point the edit made applicable to edit at least — the actual making of the tea — it is characterized by providing the record means which carries out medium record of the edit information showing the change mode in an attribute, a next editing point position, and a next editing point, and the alphabetic information superimposed for an edit material individually, respectively

[0010] the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in invention according to claim 6 — with the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded the edit from this record medium — with the temporary storage process which reads and stores temporarily the compression material of the actual making of the tea, and the compression material after an editing point the edit stored temporarily in this temporary storage process — parallel [reading the compression material of the actual making of the tea, and the compression material after an editing point to time sharing at the speed of 1X or more] — like — decoding — edit — with the decode process which generates the material of the actual making of the tea, and the material after an editing point the edit generated in this decode process — the material of the actual making of the tea, and the material after an editing point — an editing point — changing — edit — with the renewal process which reproduces the edit material which doubled the time-axis of the material of the actual making of the tea, and the material after an editing point the edit made applicable to edit at least — the actual making of the tea — it is characterized by providing the record process which carries out medium record of the edit information showing the change mode in each attribute, the next editing point position, and the next editing point of a compression material, and the alphabetic information superimposed for an edit material individually, respectively

[0011] The compression material of the actual making of the tea and the compression material after an editing point are read and stored temporarily. the edit to which the edge left for applying paste of 1 or more GOPs was added forward and backward at least in this invention — the edit from the record medium with which the compression material of the actual making of the tea and the compression material after an editing point were recorded — Read the compression material of the actual making of the tea, and the compression material after an editing point at the speed of 1X or more, and they are decoded. this edit stored temporarily — edit — the edit after generating the material of the actual making of the tea, and the material after an editing point — the editing point of having specified the material of the actual making of the tea, and the material after an editing point — changing — edit — the actual making of the tea — since the time-axis of each next material is doubled and it reproduces, it becomes possible to edit a compression material, without inviting picture degradation

[0012]

[Embodiments of the Invention] Hereafter, one gestalt of operation of this invention is explained with reference to a drawing. The <BR (1)> block diagram 1 is a block diagram showing the composition of the record regenerative apparatus by one gestalt of operation of this invention. In this drawing, the input section 1 is equipped with alter operation children, such as a keyboard and a mouse, generates the event which directs execution of material reproduction, record, and edit according to operation of these alter operation child, and outputs it to CPU2. CPU2 performs the control program loaded to the system memory which is not illustrated according to the event supplied from the input section 1, and controls each part of equipment to perform material reproduction, record, and edit. A display 3 consists of for example, LCD displays etc., and carries out a screen display of an established state, a mode of operation, etc. of each part of equipment according to the display-control signal supplied from CPU2.

[0013] RAM4 is equipped with a data area and a work area. Various register flag data are stored temporarily in the work area of RAM4. On the other hand, the MPEG data supplied from the data decoding section 9 mentioned later are stored temporarily at the data area of RAM4. The data encoding section 5 changes and outputs the MPEG data read from the data area of RAM4 according to directions of CPU2 to the data format illustrated to drawing 2.

[0014] That is, it changes into the file data FD which formed Header HD in the head after adding the "edge left for applying paste" of 1 or more GOPs before and after the MPEG data read from the data area of RAM4 so that it might illustrate to drawing 2, and formed Footer FT in the back end, respectively. Header HD and Footer FT consist of two or more attribute items showing the contents of a file, such as a file size. In addition, the "edge left for applying paste" of 1 or more GOPs added before and after MPEG data is dummy data for performing reproduction of 1X or more.

[0015] Optical disk units 6 and 7 record the file data FD (refer to drawing 2) outputted according to the record directions from CPU2 from the data encoding section 5 or a hard disk drive unit 8, respectively on an optical disk, reproduce the file data FD by which reproduction directions are carried out from CPU2 among the file data FD recorded on an optical disk, and output it to the data decoding section 9 or a hard disk drive unit 8. In addition, the file data FD recorded on an optical disk is preferably arranged in order of reproduction, and carries out medium record. If file data FD is arranged in order of reproduction and medium record is carried out, correspondence will become possible with the optical disk units 6 and 7 with a low reproduction rate.

[0016] While a hard disk drive unit 8 records the file data FD outputted from the file data FD by which a reproduction output is carried out from optical disk units 6 and 7, or the data encoding section 5 according to the record directions from CPU2, it reproduces the file data FD by which reproduction directions are carried out from CPU2 among the recorded file data FD, and outputs it to optical disk units 6 and 7 or the data decoding section 9. Moreover, the control program is memorized by this hard disk drive unit 8, and the control program is transmitted to

the system memory which is not illustrated at the time of an equipment boot rise. Under control of CPU2, the data decoding section 9 extracts MPEG data from the file data FD which optical disk units 6 and 7 or a hard disk drive unit 8 reproduces, and they carry out a store to the data area of RAM4.

[0017] The MPEG decoders 10 and 11 decode in parallel the MPEG data read from the data area of RAM4 to time sharing, and output the video signals S1 and S2 of baseband to the bottom of control of CPU2. The video switcher 12 changes the video signals S1 and S2 outputted, respectively at an editing point from the MPEG decoders 10 and 11 of the preceding paragraph according to the change signal SEL which CPU2 generates according to editing point specification operation in the input section 1. A keyer 13 superimposes the alphabetic information given to the video signal S1 (S2) changed by the video switcher 12 from CPU2. A video monitor 14 carries out a screen display of the edited video signal.

[0018] (2) Perform and give edit operation ***** explanation in the edit equipment by operation, next the above-mentioned composition. Here, explanation of operation is given at an editing point, using as an example cut edit. changed from the compression material A recorded on the optical disk unit 6 to the compression material B recorded on the optical disk unit 7. If first specification operation is carried out so that the compression materials A and B may be made applicable to edit in the input section 1, it is directed to an optical disk unit 6 that CPU2 reproduces the file data FD which contains the compression material A (MPEG data A) according to the operation. Thereby, an optical disk unit 6 carries out the reproduction output of the file data FD containing the compression material A (MPEG data A).

[0019] Next, it is directed that CPU2 decodes the file data FD by which a reproduction output is carried out from an optical disk unit 6 to the data decoding section 9. Then, while the data decoding section 9 divides the file data FD into header HD / footer FT (refer to drawing 2), and the MPEG data A and transmits header HD / footer FT to the CPU2 side, it carries out the store of the separated MPEG data A to the data area of RAM4. If it finishes carrying out the store of the MPEG data A to the data area of RAM4, the file data FD which contains like **** the compression material B (MPEG data B) reproduced from an optical disk unit 7 will be made to decode in the data decoding section 9, and the store of the MPEG data B obtained by this will be carried out to the data area of RAM4.

[0020] if the both sides of the MPEG data A and B made applicable to edit are stored in the data area of RAM4 — editing point specification operation in the input section 1 — corresponding — CPU2 — edit — the MPEG data A which are the compression material A of the actual making of the tea are read from the data area of RAM4. Under the present circumstances, it reads from the need of preparing the "edge left for applying paste" mentioned above before and after the editing point, by the reproduction speed 1X or more, and the MPEG decoder 10 is supplied. And before read-out to an editing point finishes, it is begun by the reproduction speed 1X or more to read the MPEG data B which are the compression material B after an editing point from the data area of RAM4, and the MPEG decoder 11 is supplied.

[0021] In this way, if the MPEG data A and B are read from the data area of RAM4 to time sharing and it is inputted into the MPEG decoders 10 and 11 in parallel, respectively, at the MPEG decoder 10, the baseband video signal A which comes to decode the MPEG data A will be outputted, and, on the other hand, the baseband video signal B which comes to decode the MPEG data B will be outputted by the MPEG decoder 11. A screen display of the baseband video signals A and B outputted from the MPEG decoders 10 and 11, respectively is carried out to a video monitor 14 as an edit material which was changed at the editing point and continued on the time-axis so that it may be inputted into the video switcher 12 and may illustrate to drawing 2.

[0022] In addition, in the video switcher 12 which changes the baseband video signals A and B, it is also possible to give special effect, such as wipe from which it changes to a back picture after DEZORUBU, straight line, and curve the picture before and behind an editing point changes lapping move by changing a change mode besides the cut edit changed from the baseband video signal A to the baseband video signal B in an instant.

[0023] The file data FD which stored the compression material of the actual making of the tea, and the file data FD which stored the compression material after an editing point are read from a record medium. thus — the form of this operation — edit — The store of the MPEG data respectively extracted from these file data FD is carried out to RAM4. the edit from this RAM4 — by the reproduction speed of each 1X or more, the MPEG data of the actual making of the tea and the MPEG data after an editing point were read to time sharing, and were decoded in parallel by the MPEG decoders 10 and 11 — edit, since the baseband video signal of the actual making of the tea and the baseband video signal after an editing point are changed with an editing point by the video switcher 12 and a time-axis is doubled. Whenever it edits, as a result of it becoming unnecessary to repeat decode (extension) / re-sign (compression) between baseband and a compression material like before, it is possible to edit a compression material, without inviting picture degradation.

[0024] By the way, since it edits so that a time-axis may be doubled in case not the thing that carries out edit processing of the compression material by which medium record was carried out directly with the form of this operation but the compression material by which medium record was carried out is decoded to baseband and it reproduces, the edited image will be carried out as a compression material, and carrying out medium record will not carry out, but medium record will be carried out in the edit information expressed the contents of edit. That is, if medium record of the edit information showing the attribute (header HD / footer FT of each file data FD which stored the compression material before and behind an editing point), editing point position, and baseband change mode (cut, edit, DEZORUBU, wipe) of the file data FD made applicable to edit is carried out, it will be possible to read it and to reproduce an edit material. Moreover, by the keyer 13, the alphabetic information

superimposed for an edit material carries out medium record individually rather than is recorded in the state where it put on the edit material, or, in addition to edit information, medium record is carried out, and in case an edit material is reproduced, it becomes the form superimposed for the edit material which records it and is reproduced. [0025] In addition, after the MPEG data A and B which are the candidates for edit storage in the data area of RAM4 with the form of operation mentioned above, the MPEG data A and B are read to time sharing by the reproduction speed 1X or more before and behind an editing point, the edit after decoding it in parallel by the MPEG decoders 10 and 11, although the baseband video signal of the actual making of the tea and the baseband video signal after an editing point are changed with an editing point by the video switcher 12 and the time-axis was doubled. Change to this, decode in parallel the MPEG data A and B read from the record medium by the reproduction speed 1X or more by the MPEG decoders 10 and 11, and it stores in the data area of RAM4, the edit stored in the data area of this RAM4 — you may make it the composition read and reproduced so that the baseband video signal of the actual making of the tea and the baseband video signal after an editing point may be changed at an editing point. Moreover, although the material by which MPEG compression was carried out was made applicable to edit with the form of operation mentioned above, the summary of this invention is not limited to this, but can be applied by other animation compression methods other than an MPEG method.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the composition of the edit equipment which is one gestalt of operation by this invention.

[Drawing 2] It is drawing showing the composition of file data FD.

[Drawing 3] It is drawing for explaining edit operation.

[Description of Notations]

1 [— A display, 4 / — RAM, 5 / — 6 The data encoding section 7 / — An optical disk unit, 8 / — A hard disk drive unit, 9 / — 10 The data decoding section 11 / — An MPEG decoder, 12 / — A video switcher, 13 / — A keyer, 14 / — Video monitor.] — The input section, 2 — CPU, 3

[Translation done.]

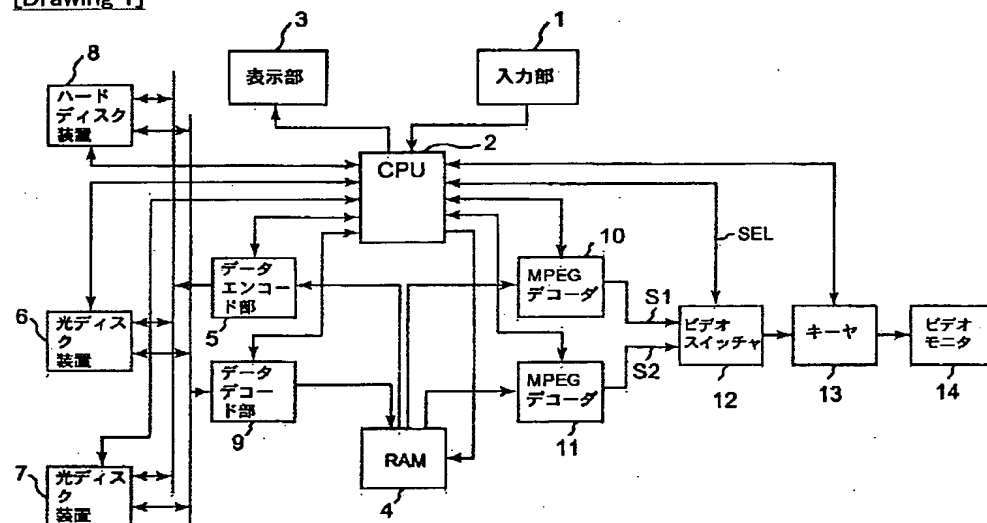
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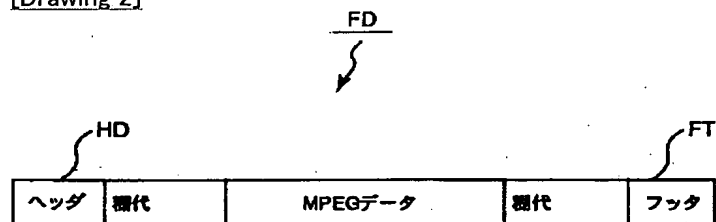
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DRAWINGS

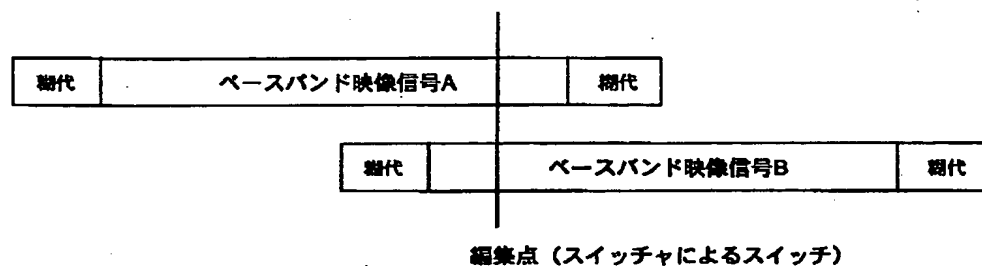
[Drawing 1]



[Drawing 2]



[Drawing 3]



[Translation done.]

【特許請求の範囲】

【請求項1】 少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、

この記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶する一時記憶手段と、
この一時記憶手段から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出して並列的に復号し、編集点前の素材と編集点後の素材とを生成する復号手段と、

この復号手段が生成した編集点前の素材と編集点後の素材とを指定した編集点で切り替え、編集点前後の各素材の時間軸を合わせて再生する再生手段とを具備することを特徴とする記録再生装置。

【請求項2】 少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、

この記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶する一時記憶過程と、
この一時記憶過程にて一時記憶された編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出して並列的に復号し、編集点前の素材と編集点後の素材とを生成する復号過程と、

この復号過程にて生成された編集点前の素材と編集点後の素材とを指定した編集点で切り替え、編集点前後の各素材の時間軸を合わせて再生する再生過程とを具備することを特徴とする記録再生方法。

【請求項3】 少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、

この記録媒体から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で読み出して復号する復号手段と、

この復号手段が生成した編集点前の素材および編集点後の素材を一時記憶する一時記憶手段と、

この一時記憶手段に記憶された編集点前の素材と編集点後の素材とを指定した編集点で切り替えるように読み出して編集点前後の各素材の時間軸を合わせて再生する再生手段とを具備することを特徴とする記録再生装置。

【請求項4】 少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、

この記録媒体から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で読み出して復号する復号過程と、

この復号過程にて生成された編集点前の素材および編集点後の素材を一時記憶する一時記憶過程と、

この一時記憶過程にて一時記憶された編集点前の素材と編集点後の素材とを指定した編集点で切り替えるように読み出して編集点前後の各素材の時間軸を合わせて再生

する再生過程とを具備することを特徴とする記録再生方法。

【請求項5】 少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、

この記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶する一時記憶手段と、
この一時記憶手段から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出しながら並列的に復号し、編集点前の素材と編集点後の素材とを生成する復号手段と、

この復号手段が生成した編集点前の素材と編集点後の素材とを編集点で切り替え、編集点前の素材と編集点後の素材との時間軸を合わせた編集素材を再生する再生手段と、

少なくとも編集対象にされた編集点前後の属性、編集点位置および編集点での切り替え態様を表す編集情報と、編集素材にスーパーインポーズされる文字情報とをそれぞれ個別に媒体記録する記録手段とを具備することを特徴とする記録再生装置。

【請求項6】 少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、

この記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶する一時記憶過程と、
この一時記憶過程にて一時記憶された編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出しながら並列的に復号し、編集点前の素材と編集点後の素材とを生成する復号過程と、

この復号過程にて生成された編集点前の素材と編集点後の素材とを編集点で切り替え、編集点前の素材と編集点後の素材との時間軸を合わせた編集素材を再生する再生過程と、

少なくとも編集対象にされた編集点前後の圧縮素材の各属性、編集点位置および編集点での切り替え態様を表す編集情報と、編集素材にスーパーインポーズされる文字情報とをそれぞれ個別に媒体記録する記録過程とを具備することを特徴とする記録再生方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、例えばMPEG (Moving Picture Experts Group) 方式で圧縮符号化された映像信号を記録再生する記録再生方法および記録再生装置に関する。

【0002】

【従来の技術】 MPEG方式などで圧縮符号化された映像信号 (以下、圧縮素材と称す) は、複数フレーム分の画 (ピクチャ) を集めたGOP (Group Of Pictures) と呼ばれるグループを一つの単位として圧縮符号化されている。MPEG方式ではGOP単位のフレーム相関を

用いて圧縮符号化される為、編集に制約が生じる。例外的に1フレーム1GOPの所謂、クローズドGOPであれば、GOPの切れ目と編集点を一致させたカット編集を行っても問題は生じない。

【0003】しかしながら、1GOPの中で映像信号の隣接フレームに復号に必要な情報がある場合には単純に他の圧縮素材と繋ぐような編集を行うと、画像の情報が混じり合い繋ぎ目で正しく復号されず画像が乱れたりノイズ発生の原因となる。その為、他の圧縮素材と時間軸上で繋ぎ合わせたり、ワイプやデゾルブ等の特殊効果を入れるなどの編集を行うには、圧縮素材を一旦、復号（伸長）してベースバンドに戻してから編集を施し、編集後に再び圧縮符号化して圧縮素材を得るようにしている。

【0004】

【発明が解決しようとする課題】ところで、かかる編集態様では、編集を行う都度、ベースバンドと圧縮素材との間で復号（伸長）／再符号（圧縮）を繰り返す結果、画像劣化を招致する、という問題がある。そこで本発明は、このような事情に鑑みてなされたもので、画像劣化を招致することなく圧縮素材を編集することができる記録再生方法および記録再生装置を提供することを目的としている。

【0005】

【課題を解決するための手段】上記目的を達成するため、請求項1に記載の発明では、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、この記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶する一時記憶手段と、この一時記憶手段から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出して並列的に復号し、編集点前の素材と編集点後の素材とを生成する復号手段と、この復号手段が生成した編集点前の素材と編集点後の素材とを指定した編集点で切り替え、編集点前後の各素材の時間軸を合わせて再生する再生手段とを具備することを特徴とする。

【0006】請求項2に記載の発明では、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、この記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶する一時記憶過程と、この一時記憶過程にて一時記憶された編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出して並列的に復号し、編集点前の素材と編集点後の素材とを生成する復号過程と、この復号過程にて生成された編集点前の素材と編集点後の素材とを指定した編集点で切り替え、編集点前後の各素材の時間軸を合わせて再生する再生過程とを具備することを特徴とする。

【0007】請求項3に記載の発明では、少なくとも前

後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、この記録媒体から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で読み出して復号する復号手段と、この復号手段が生成した編集点前の素材および編集点後の素材を一時記憶する一時記憶手段と、この一時記憶手段に記憶された編集点前の素材と編集点後の素材とを指定した編集点で切り替えるように読み出して編集点前後の各素材の時間軸を合わせて再生する再生手段とを具備することを特徴とする。

【0008】請求項4に記載の発明では、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、この記録媒体から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で読み出して復号する復号過程と、この復号過程にて生成された編集点前の素材および編集点後の素材を一時記憶する一時記憶過程と、この一時記憶過程にて一時記憶された編集点前の素材と編集点後の素材とを指定した編集点で切り替えるように読み出して編集点前後の各素材の時間軸を合わせて再生する再生過程とを具備することを特徴とする。

【0009】請求項5に記載の発明では、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、この記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶する一時記憶手段と、この一時記憶手段から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出しながら並列的に復号し、編集点前の素材と編集点後の素材とを生成する復号手段と、この復号手段が生成した編集点前の素材と編集点後の素材とを編集点で切り替え、編集点前の素材と編集点後の素材との時間軸を合わせた編集素材を再生する再生手段と、少なくとも編集対象にされた編集点前後の属性、編集点位置および編集点での切り替え態様を表す編集情報と、編集素材にスーパーインポーズされる文字情報とをそれぞれ個別に媒体記録する記録手段とを具備することを特徴とする。

【0010】請求項6に記載の発明では、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体と、この記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶する一時記憶過程と、この一時記憶過程にて一時記憶された編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出しながら並列的に復号し、編集点前の素材と編集点後の素材とを生成する復号過程と、この復号過程にて生成された編集点前の素材と編集点後の素材とを編集点で切り替え、編集点前の素材と編集点後の素材との時間軸を合わせた編集素材を再生する再生過程と、少なくとも編集対象にされた編集点前後の圧縮素材の各属性、編

集点位置および編集点での切り替え態様を表す編集情報と、編集素材にスーパーインポーズされる文字情報とをそれぞれ個別に媒体記録する記録過程とを具備することを特徴とする。

【0011】本発明では、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶しておき、この一時記憶された編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で読み出して復号し、編集点前の素材と編集点後の素材とを生成した後、編集点前の素材と編集点後の素材とを指定した編集点で切り替え、編集点前後の各素材の時間軸を合わせて再生するので、画像劣化を招致することなく圧縮素材を編集することが可能になる。

【0012】

【発明の実施の形態】以下、図面を参照して本発明の実施の一形態について説明する。

(1) 構成

図1は、本発明の実施の一形態による記録再生装置の構成を示すブロック図である。この図において、入力部1はキーボードやマウス等の入力操作子を備え、これら入力操作子の操作に応じて、素材再生、記録および編集の実行を指示するイベントを発生してCPU2に出力する。CPU2は図示されていないシステムメモリにロードされた制御プログラムを、入力部1から供給されるイベントに応じて実行し、素材再生、記録および編集を行うよう装置各部を制御する。表示部3は、例えばLCDディスプレイ等から構成され、CPU2から供給される表示制御信号に応じて装置各部の設定状態や動作モード等を画面表示する。

【0013】RAM4は、データエリアとワークエリアとを備える。RAM4のワークエリアには、各種レジスタ・フラグデータが一時記憶される。一方、RAM4のデータエリアには、後述するデータデコード部9から供給されるMPEGデータが一時記憶される。データエンコード部5は、CPU2の指示に応じてRAM4のデータエリアから読み出されるMPEGデータを図2に図示するデータ形式に変換して出力する。

【0014】すなわち、図2に図示するように、RAM4のデータエリアから読み出されたMPEGデータの前後に1GOP以上の「糊代」を付加した上、その先頭にはヘッダHDを、後端にはフッタFTをそれぞれ設けたファイルデータFDに変換する。ヘッダHDおよびフッタFTはファイルサイズ等のファイル内容を表す複数の属性項目から構成される。なお、MPEGデータの前後に付加される1GOP以上の「糊代」とは、1倍速以上の再生を行うためのダミーデータである。

【0015】光ディスク装置6、7は、それぞれCPU2からの記録指示に従い、データエンコード部5あるい

はハードディスク装置8から出力されるファイルデータFD（図2参照）を光ディスクに記録したり、光ディスクに記録されるファイルデータFDの内、CPU2から再生指示されるファイルデータFDを再生してデータデコード部9あるいはハードディスク装置8に出力する。なお、光ディスクに記録されるファイルデータFDは、好ましくは再生順に並べて媒体記録する。ファイルデータFDを再生順に並べて媒体記録しておけば、再生レートの低い安価な光ディスク装置6、7でも対応可能になる。

【0016】ハードディスク装置8は、CPU2からの記録指示に従い、光ディスク装置6、7から再生出力されるファイルデータFDもしくはデータエンコード部5から出力されるファイルデータFDを記録する一方、記録したファイルデータFDの内、CPU2から再生指示されるファイルデータFDを再生して光ディスク装置6、7あるいはデータデコード部9に出力する。また、このハードディスク装置8には、制御プログラムが記憶されており、その制御プログラムは装置ブートアップ時に図示されていないシステムメモリに転送される。データデコード部9は、CPU2の制御の下に、光ディスク装置6、7あるいはハードディスク装置8が再生するファイルデータFDからMPEGデータを抽出してRAM4のデータエリアにストアする。

【0017】MPEGデコーダ10、11は、CPU2の制御の下に、RAM4のデータエリアから時分割に読み出されるMPEGデータを並列的に復号してベースバンドの映像信号S1、S2を出力する。ビデオスイッチ12は、入力部1での編集点指定操作に応じてCPU2が発生する切り替え信号SELに従い、前段のMPEGデコーダ10、11からそれぞれ出力される映像信号S1、S2を編集点で切り替える。キー13はビデオスイッチ12にて切り替えられた映像信号S1（S2）に、CPU2から与えられる文字情報等をスーパーインポーズする。ビデオモニタ14は編集された映像信号を画面表示する。

【0018】(2) 動作

次に、上記構成による編集装置において実行される編集動作について説明する。ここでは、編集点で光ディスク装置6に記録された圧縮素材Aから光ディスク装置7に記録された圧縮素材Bに切り替えるカット編集を一例として動作説明する。最初に、入力部1において圧縮素材A、Bを編集対象にするよう指定操作すると、CPU2はその操作に応じて圧縮素材A（MPEGデータA）を含むファイルデータFDを再生するよう光ディスク装置6に指示する。これにより、光ディスク装置6は圧縮素材A（MPEGデータA）を含むファイルデータFDを再生出力する。

【0019】次に、CPU2はデータデコード部9に対し、光ディスク装置6から再生出力されるファイルデー

タFDをデコードするよう指示する。すると、データデコード部9は、そのファイルデータFDをヘッダHD/フッタFT(図2参照)とMPEGデータAとに分離し、ヘッダHD/フッタFTをCPU2側に転送する一方、分離したMPEGデータAをRAM4のデータエリアにストアする。MPEGデータAをRAM4のデータエリアにストアし終わったら、上述と同様に、光ディスク装置7から再生される圧縮素材B(MPEGデータB)を含むファイルデータFDをデータデコード部9にてデコードさせ、これにより得られるMPEGデータBをRAM4のデータエリアにストアする。

【0020】編集対象とされたMPEGデータA、Bの双方がRAM4のデータエリアに格納されると、入力部1での編集点指定操作に対応してCPU2が編集点前の圧縮素材AであるMPEGデータAをRAM4のデータエリアから読み出す。この際、編集点前後に前述した「糊代」を設ける必要性から1倍速以上の再生速度で読み出してMPEGデコード10に供給する。そして、編集点までの読み出しが終わる前に、編集点後の圧縮素材BであるMPEGデータBをRAM4のデータエリアから1倍速以上の再生速度で読み出し始めてMPEGデコード11に供給する。

【0021】こうして、RAM4のデータエリアからMPEGデータA、Bが時分割に読み出されてMPEGデコード10、11にそれぞれ並列的に入力されると、MPEGデコード10ではMPEGデータAを復号してなるベースバンド映像信号Aを出力し、一方、MPEGデコード11ではMPEGデータBを復号してなるベースバンド映像信号Bを出力する。MPEGデコード10、11からそれぞれ出力されるベースバンド映像信号A、Bは、ビデオスイッチャ12に入力され、図2に図示するように、編集点で切り替えられ、時間軸上で連続した編集素材としてビデオモニタ14に画面表示される。

【0022】なお、ベースバンド映像信号A、Bを切り替えるビデオスイッチャ12では、ベースバンド映像信号Aから一瞬にしてベースバンド映像信号Bに切り替えるカット編集の他、切り替え態様を変化させることで、編集点の前後の画像が重なりつつ切り替わるデゾルブや、直線や曲線が動いたあとが後ろの画像に切り替わるワイプなどの特殊効果を付与することも可能になっている。

【0023】このように、本実施の形態では、編集点前の圧縮素材を格納したファイルデータFDと編集点後の圧縮素材を格納したファイルデータFDとを記録媒体から読み出し、それらファイルデータFDから各々抽出したMPEGデータをRAM4にストアしておき、このRAM4から編集点前のMPEGデータと編集点後のMPEGデータとを各々1倍速以上の再生速度で時分割に読み出してMPEGデコード10、11にて並列的に復号した、編集点前のベースバンド映像信号と編集点後のベ

ースバンド映像信号とをビデオスイッチャ12にて編集点で切り替えて時間軸を合わせるのを、従来のように、編集を行う都度、ベースバンドと圧縮素材との間で復号(伸長)/再符号(圧縮)を繰り返す必要がなくなる結果、画像劣化を招致することなく圧縮素材を編集することが可能になっている。

【0024】ところで、本実施の形態では、媒体記録された圧縮素材を直接的に編集加工するものではなく、媒体記録された圧縮素材をベースバンドに復号して再生する際に時間軸を合わせるように編集するので、編集された映像を圧縮素材として媒体記録することはせず、その編集内容を表す編集情報を媒体記録することになる。つまり、編集対象にしたファイルデータFDの属性(編集点前後の圧縮素材を格納した各ファイルデータFDのヘッダHD/フッタFT)、編集点位置およびベースバンド切り替え態様(カット編集、デゾルブあるいはワイプ)を表す編集情報を媒体記録しておけば、それを読み出して編集素材を再生することが可能になる。また、キーヤ13によって編集素材にスーパーインポーズされる文字情報なども編集素材に重ねた状態で記録するのではなく、個別に媒体記録するか、もしくは編集情報に加えて媒体記録しておき、編集素材を再生する際にそれを読み出して再生される編集素材にスーパーインポーズする形になる。

【0025】なお、上述した実施の形態では、編集対象であるMPEGデータA、BがRAM4のデータエリアに蓄えてから、編集点前後でMPEGデータA、Bを1倍速以上の再生速度で時分割に読み出し、それをMPEGデコード10、11にて並列的に復号した後、編集点前のベースバンド映像信号と編集点後のベースバンド映像信号とをビデオスイッチャ12にて編集点で切り替えて時間軸を合わせるようにしたが、これに替えて、記録媒体から1倍速以上の再生速度で読み出したMPEGデータA、BをMPEGデコード10、11にて並列的に復号してRAM4のデータエリアに蓄え、このRAM4のデータエリアに蓄えた編集点前のベースバンド映像信号と編集点後のベースバンド映像信号とを編集点で切り替えるように読み出して再生する構成にしても良い。また、上述した実施の形態では、MPEG圧縮された素材を編集対象としたが、本発明の要旨はこれに限定されず、MPEG方式以外の他の動画圧縮方式でも適用可能である。

【0026】

【発明の効果】請求項1、2に記載の発明によれば、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体から編集点前の圧縮素材および編集点後の圧縮素材を読み出して一時記憶しておき、この一時記憶された編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出して並列的に復号し、編集点

前の素材と編集点後の素材とを生成した後、編集点前の素材と編集点後の素材とを指定した編集点で切り替え、編集点前後の各素材の時間軸を合わせて再生するので、画像劣化を招致することなく圧縮素材を編集することができる。請求項3、4に記載の発明によれば、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材が記録された記録媒体から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で読み出して復号し、編集点前の素材と編集点後の素材とを生成し、生成した編集点前の素材および編集点後の素材を一時記憶した後、この一時記憶された編集点前の素材と編集点後の素材とを指定した編集点で切り替えるように読み出して編集点前後の各素材の時間軸を合わせて再生するので、画像劣化を招致することなく圧縮素材を編集することができる。請求項5に記載の発明によれば、再生手段が少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材を記録媒体から再生して一時記憶手段に格納すると、復号手段がこの一時記憶手段から編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出しながら並列的に復号して編集点前の素材と編集点後の素材とを生成し、編集手段が編集点前の素材と編集点後の素材とを編集点で切り替え、編集点前の素材と編集点後の素材との時間軸を合わせた編集素材を生成して表示するので、画像劣化を招致することなく圧縮素材を編集することができる。また、記録手段は、少なくとも編集対象にされた編集点前後の属性、編集点位置および編集点での切り替え態様を表す編集情報と、編集素材にスーパーインポーズされる文字情報とをそれぞれ個別に媒体記録する為、その編集情報や文字情

報を記録媒体から読み出して参照すれば、前回と同じ編集を行うことができる。請求項6に記載の発明によれば、少なくとも前後に1GOP以上の糊代が付加された編集点前の圧縮素材および編集点後の圧縮素材を記録媒体から再生して一時記憶しておき、この一時記憶された編集点前の圧縮素材と編集点後の圧縮素材とを1倍速以上の速度で時分割に読み出しながら並列的に復号して編集点前の素材と編集点後の素材とを生成し、生成した編集点前の素材と編集点後の素材とを編集点で切り替え、編集点前の素材と編集点後の素材との時間軸を合わせた編集素材を生成して表示するから、画像劣化を招致することなく圧縮素材を編集することができる。また、少なくとも編集対象にされた編集点前後の圧縮素材の各属性、編集点位置および編集点での切り替え態様を表す編集情報と、編集素材にスーパーインポーズされる文字情報とをそれぞれ個別に媒体記録する為、その編集情報や文字情報を記録媒体から読み出して参照すれば、前回と同じ編集を行うことができる。

【図面の簡単な説明】

【図1】本発明による実施の一形態である編集装置の構成を示すブロック図である。

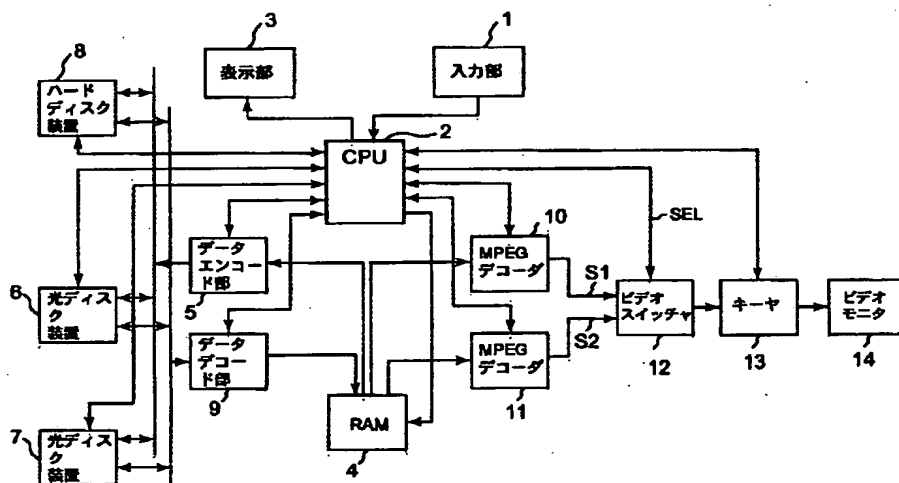
【図2】ファイルデータFDの構成を示す図である。

【図3】編集動作を説明するための図である。

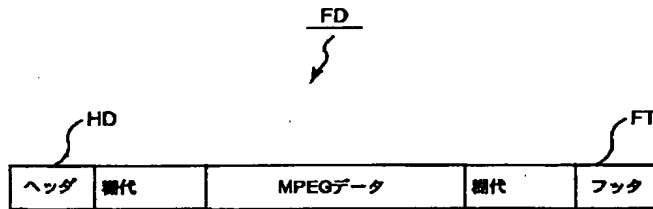
【符号の説明】

1…入力部、2…CPU、3…表示部、4…RAM、5…データエンコード部、6、7…光ディスク装置、8…ハードディスク装置、9…データデコード部、10、11…MPEGデコード部、12…ビデオスイッチャ、13…キー、14…ビデオモニタ。

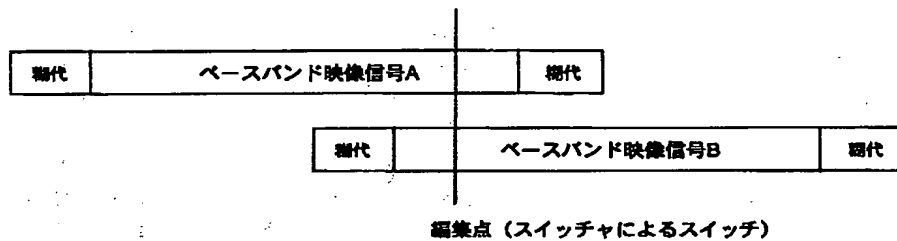
【図1】



【図2】



【図3】



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